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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/765,920	01/29/2004	Minoru Yoshida	520.43429X00	2671
20457	7590	04/10/2006		
ANTONELLI, TERRY, STOUT & KRAUS, LLP 1300 NORTH SEVENTEENTH STREET SUITE 1800 ARLINGTON, VA 22209-3873			EXAMINER ZETTL, MARY E	
			ART UNIT 2875	PAPER NUMBER

DATE MAILED: 04/10/2006

Please find below and/or attached an Office communication concerning this application or proceeding.

# Office Action Summary

Application No.

10/765,920

Applicant(s)

YOSHIDA ET AL.

Examiner

Mary Zettl

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-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

## Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

## Status

- 1) ☒ Responsive to communication(s) filed on 13 February 2006.
- 2a) ☒ This action is **FINAL**. 2b) ☐ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

## Disposition of Claims

- 4) ☒ Claim(s) 1-21 is/are pending in the application.
- 4a) Of the above claim(s) \_\_\_\_\_ is/are withdrawn from consideration.
- 5) ☐ Claim(s) \_\_\_\_\_ is/are allowed.
- 6) ☒ Claim(s) 1-21 is/are rejected.
- 7) ☐ Claim(s) \_\_\_\_\_ is/are objected to.
- 8) ☐ Claim(s) \_\_\_\_\_ are subject to restriction and/or election requirement.

## Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☒ The drawing(s) filed on 29 January 2004 is/are: a) ☒ accepted or b) ☐ objected to by the Examiner.  
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).  
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

## Priority under 35 U.S.C. § 119

- 12) ☒ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☒ All b) ☐ Some \* c) ☐ None of:
1. ☒ Certified copies of the priority documents have been received.
  2. ☐ Certified copies of the priority documents have been received in Application No. \_\_\_\_\_.
  3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

\* See the attached detailed Office action for a list of the certified copies not received.

## Attachment(s)

- |  |   |
|--|---|
| 1) <input checked="" type="checkbox"/> Notice of References Cited (PTO-892)                        | 4) <input type="checkbox"/> Interview Summary (PTO-413)                     |
| 2) <input type="checkbox"/> Notice of Draftsperson's Patent Drawing Review (PTO-948)               | Paper No(s)/Mail Date. _____  |
| 3) <input checked="" type="checkbox"/> Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08) | 5) <input type="checkbox"/> Notice of Informal Patent Application (PTO-152) |
| Paper No(s)/Mail Date <u>11/7/2005</u>   | 6) <input type="checkbox"/> Other: _____                                    |

**DETAILED ACTION**

***Response to Amendment***

1. The amendment filed on February 13, 2006 has been entered.

***Claim Rejections - 35 USC § 103***

The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

2. Claims 1-21 are rejected under 35 U.S.C. 103(a) as being unpatentable over Morita et al (US 2002/0067477 A1) in view of Maeda et al. (US 6,621,571 B1).

Regarding claims 1, 2, 7, 13, 15, 16, and 20, Morita et al. teaches a pattern defect (line width of resist pattern deviating from desired one; page 1, paragraph 10) inspection apparatus (Abstract) comprising: an illumination optical system including: a laser light source for emitting ultraviolet laser light (Figure 2, item 13); a shutter (Figure 2, item 17) for selectively restricting passage of the ultraviolet laser light emitted from the laser light source, which is opened to allow passage of UV laser light and closed after closed after the reflected light image has been imaged by the detector (page 5, paragraph 63); a quantity-of-light adjusting unit (shutter adjusting quantity of light, light-amount monitor, and the controller; page 4, paragraph 52 and page 5, paragraphs 60 and 62) for adjusting a quantity of the ultraviolet laser light emitted from the laser light source and including a filter (ND filter; Figure 2, item 15; page 4, paragraph 51); an

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illumination range forming unit (rotating diffusion plate; page 4, paragraph 55) for forming on a sample an illumination range of the ultraviolet laser light whose quantity has been adjusted by the quantity-of light adjusting unit; a quantity-of-light calculating unit for calculating a quantity of ultraviolet laser light (light-amount monitor; page 5, paragraph 61); a coherence reducing system (page 5, paragraph 57) for reducing coherence of the ultraviolet laser light received within the illumination range that has been formed by the illumination range forming unit; and an irradiation optical system (polarization beam splitter; Figure 2, item 24) for irradiating the sample with a ultraviolet light flux whose coherence has been reduced by the coherence reducing system; and a detection optical system including: a condensing optical system (page 5, paragraph 56) for condensing light reflected from the sample; a diffracted-light control optical system (transmitting light through objective lens; page 5, paragraph 64) for controlling diffracted light of the reflected light that has been condensed by the condensing optical system comprising a polarization element group (page 5, paragraph 58), and a detecting unit (light amount monitor; page 5, paragraph 61) for imaging a reflected light image coming from the sample to detect an image signal, said reflected light image being obtained through the diffracted-light control optical system. Morita et al. does not disclose expressly the presence of a recipe setting unit. Maeda et al. teach the use of a recipe setting unit (col. 6 lines 39-50). At the time the invention was made, it would have been obvious to have modified the invention of Morita et al. such that a recipe setting unit as taught by Maeda et al. was added so that the semiconductor production line was run in an efficient manner.

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Regarding claims 3 and 17, Morita et al. further teach an image processing unit (page 6, paragraph 68).

Regarding claims 5, 6, and 19, Morita et al. further teach the shutter controlling the ultraviolet laser light so that the light is switched between a state close to ON and a state close to OFF (page 4, paragraph 52) and wherein the shutter can arbitrarily control a period of time during which the ultraviolet laser light is in a state close to OFF (page 5, paragraph 62).

Regarding claim 8, Morita et al. further teach the filter being devised not to return light reflected from an incident plane to the laser light source (not return light of a different order; page 7, paragraph 86).

Regarding claim 9, Morita et al. further teach a first detector (page 6, paragraph 71) for detecting an image signal for inspection and a second detector (CCD; page 5, paragraph 59) for detecting an image signal for viewing.

Regarding claim 10, Morita et al. further teach a first detector comprising an accumulated type sensor (CCD detector; page 5, paragraph 60).

Regarding claims 4 and 18, Morita et al. do not disclose expressly the use of a display screen. Maeda et al. teach the use of a display unit for displaying the defect inspection information. At the time the invention was made, it would have been obvious to one of ordinary skill in the art to modify the invention of Morita et al. such that a display screen as taught by Maeda et al. was added such that a controller or inspector had a means for modifying the defect detection process and parameters and a means for viewing what these parameters were.

Regarding claim 11, Morita et al. teach a storage unit for storing a digital reference image signal (computer; Figure 2, item 31; page 6, paragraph 68) and teach comparing the inspected image to a predetermined one (page 6, paragraph 78). Morita et al. do not disclose expressly the steps involved in the comparison of the inspected image with the predetermined one, specifically Morita does not disclose a brightness correcting unit. Maeda et al. teach a method and apparatus for detecting pattern defects, including a UV laser and the comparison between previously stored images (Abstract). Maeda et al. further teach a brightness correcting unit for correcting brightness of at least one of the digital image signals so that brightness in a normal portion of the digital detection image signal, which has been detected by the first detector and then converted into the digital signal, becomes substantially the same as brightness of a normal portion of the digital reference image signal stored in the storage unit (col. 15, lines 18-25). At the time the invention was made it would have been obvious to one of ordinary skill in the art to modify the invention of Morita et al. such that the means for brightness correction as described by Maeda et al. was added so that two images having different brightness can be compared.

Regarding claim 12, Morita et al. teach a storage unit for storing a digital reference image signal (computer; Figure 2, item 31; page 6, paragraph 68) and teach comparing the inspected image to a predetermined one (page 6, paragraph 78). Morita et al. do not disclose expressly the steps involved in the comparison of the inspected image with the predetermined one, specifically Morita does not disclose a scatter-diagram creation unit or a gray-scale converter. Maeda et al. teach a method and

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apparatus for detecting pattern defects, including a UV laser and the comparison between previously stored images (Abstract). Maeda et al. further teach a scatter-diagram creation unit (Figure 29, item 293; col. 18, line 20) for creating a scatter diagram illustrating an association between a feature index in a normal portion of the digital detection image signal and a feature index in a normal portion of the digital reference image signal stored in the storage unit, said digital detection image signal being detected by the first detector and then being converted into a digital signal and a local gray-scale converter (col. 18, line 29). At the time the invention was made, it would have been obvious to one skilled in the art to take the invention of Morita et al. and modify it such that a scatter diagram was created in order to provide a visual aid and information for detecting defects and it would have been further obvious to use a gray-scale converter so that the important image information is easily shown.

Regarding claims 14 and 21, Morita et al. teach a pattern defect inspection method comprising: a laser light source for emitting ultraviolet laser light (Figure 2, item 13); a shutter (Figure 2, item 17) for selectively restricting passage of the ultraviolet laser light emitted from the laser light source, which is opened to allow passage of UV laser light and closed after the reflected light image has been imaged by the detector (page 5, paragraph 63); a coherence reducing system (page 5, paragraph 57); an image processing unit (page 6, paragraph 68). Morita et al. do not specify the diameter of the wafer being inspected, the size of the defect, or the process throughput. Maeda et al. teach inspecting wafers having a diameter of 300 mm at a speed equivalent to three pieces of wafers or more per hour, and detecting a defect having a

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size of 100 nm included in a pattern formed on the sample (col. 23, lines 36-43). At the time the invention was made, it would have been obvious to one of ordinary skill in the art to have modified the invention of Morita et al. such that wafers with conventional sizes and defect sizes were inspected at a pace appropriate for a semiconductor production line.

### ***Response to Arguments***

3. Applicant's arguments with respect to claims 1-21 have been considered but are moot in view of the new ground(s) of rejection.

### ***Conclusion***

4. Applicant's amendment necessitated the new ground(s) of rejection presented in this Office action. Accordingly, **THIS ACTION IS MADE FINAL**. See MPEP § 706.07(a). Applicant is reminded of the extension of time policy as set forth in 37 CFR 1.136(a).

A shortened statutory period for reply to this final action is set to expire **THREE MONTHS** from the mailing date of this action. In the event a first reply is filed within **TWO MONTHS** of the mailing date of this final action and the advisory action is not mailed until after the end of the **THREE-MONTH** shortened statutory period, then the shortened statutory period will expire on the date the advisory action is mailed, and any extension fee pursuant to 37 CFR 1.136(a) will be calculated from the mailing date of



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the advisory action. In no event, however, will the statutory period for reply expire later than SIX MONTHS from the date of this final action.

5. Any inquiry concerning this communication or earlier communications from the examiner should be directed to Mary Zettl whose telephone number is (571) 272-6007.

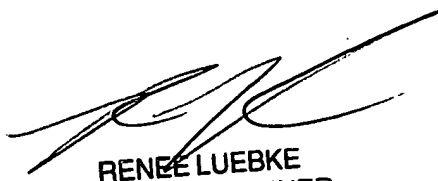
The examiner can normally be reached on M-F 8am-4:30pm.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Renee Luebke can be reached on (571) 272-2009. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).

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RENEE LUEBKE  
PRIMARY EXAMINER